REMARKS

The application has been reviewed in light of the Office Action dated August 9, 2007. Claims 1-21 were pending. By this Amendment, claim 4 has been canceled, without prejudice or disclaimer, new claims 22 and 23 have been added, claims 1, 5, 17 and 21 have been amended to clarify the claimed subject matter, and claims 6, 14, 16 and 17 have been amended to depend from new claim 23. Accordingly, claims 1-3 and 5-23 are now pending, with claims 1, 21 and 22 being in independent form.

The drawings were objected to as having informalities. The specification was objected to as having informalities.

The specification has amended to correct the formal matters noted in the Office Action.

Withdrawal of the objection to the drawings and the objection to the specification is respectfully requested.

Claim 17 was objected to as purportedly having informalities.

By this Amendment, claim 17 has amended to correct the formal matters noted in the Office Action.

Withdrawal of the objection to claim 17 is respectfully requested.

Claims 1-21 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over U.S. Patent No. 5,713,358 to Mistretta et al. in view of Ho et al. (US 2002/0087069 A1).

Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claims 1 and 21 are patentable over the cited art, for at least the following reasons.

This application relates to improvements devised by applicant for using magnetic resonance imaging (MRI) techniques to obtain measurement data (k space data) of arterial phase

after imaging a plurality of time phases including the arterial phase. Dynamic measurement is thereby carried out using a means for extracting the time phase evaluation values (for example, the origin data in k space) in respective time phases and then automatically extracting a data set including a time phase where the time phase evaluation value reaches a specified threshold value.

An aspect of this application includes dividing a k space into (a) a high repetitive-frequency measurement area containing an origin of the k space and measured at a high repetitive-frequency and (b) a plurality of low frequency measurement areas not containing the origin and measured at a low repetitive-frequency, acquiring a time phase evaluation value from the high frequency measurement area, determining a time phase in which the time phase evaluation value is a predetermined threshold value or greater, repeating measurement of the high repetitive-frequency measurement area and measurement of each of the low repetitive-frequency measurement areas between the measurements in a predetermined measurement sequence of the high-repetitive frequency measurement area and conducting measurement of a plurality of k space data, conducting image reconstruction by using the k space data and displaying the resulting image. The predetermined measurement sequence of each of the measurement areas is changed in such a manner that a measurement period of the high repetitive-frequency measurement area contains the time phase. Each of independent claims 1 and 21 addresses these features, as well as additional features.

Another aspect includes selecting the high repetitive-frequency measurement area containing, or being time-wise close to, a desired time phase and at least one low repetitive-frequency measurement area measured time-wise close to the high repetitive-frequency measurement area, from the measured measurement areas as an image reconstruction set and executing image reconstruction by using the k space data of the image reconstruction set.

Independent claim 22 addresses these features, as well as additional features.

Mistretta, as understood by Applicant, proposes an approach for performing dynamic magnetic resonance angiograph (MRA) using a 3D fast gradient-recalled echo pulse sequence, wherein the frame rate of the resulting series of reconstructed images is increased by sampling a central region of k-space at a higher rate than the peripheral regions of k-space, and image frames are reconstructed at each sampling of the central k-space region using the temporally nearest samples from the peripheral k-space regions.

Mistretta, as acknowledged in the Office Action, fails to disclose or suggest several claim features, including, for example, (i) changing a predetermined measurement sequence of each of said measurement areas in such a manner that a measurement period of said high repetitive-frequency measurement area contains said time phase (independent claims 1 and 21 of the present application), and (ii) selecting the high repetitive-frequency measurement area containing or being time-wise close to a desired time phase and at least one low repetitive-frequency measurement area measured time-wise close to said high repetitive-frequency measurement area from the measured measurement areas as an image reconstruction set (independent claim 22 of the present application).

Without such claim features, the system of Mistretta can fail to acquire a high repetitive-frequency measurement area containing a desired time phase, and a reconstructed image by the system in such cases may not correctly reflect the state of a patient at the desired time phase.

Ho, as understood by Applicant, proposes an approach for optimal imaging of the peripheral vasculature using a contrast agent to emphasize distal arterial visualization during a multi-station examination using MR technology. The technique proposed by Ho includes administering a contrast agent into the blood stream of the patient, acquiring low spatial

resolution MR images of the arterial vasculature, tracking the passage of the contrast agent through the patient, moving the patient table in response to the tracking, continuing to acquire low spatial resolution images at each of the proximal stations until the most distal station is reached and then acquiring a high spatial resolution image data set of preferentially arterial vascular structures, and acquiring higher spatial resolution images in the proximal stations.

While Ho proposes controlling the measurement sequence based on the timing predicted, such measurement sequence control is to start primarily with the acquisition of central k-space data when the monitored signal exceeds the threshold, and not to change the predetermined measurement sequence of each measurement area. That is, Ho determines only the start timing of the predetermined measurement sequence without changing the sequence itself.

Ho, contrary to the contention in the Office Action, is silent as to changing a predetermined measurement sequence of each of said measurement areas in such a manner that a measurement period of said high repetitive-frequency measurement area contains said time phase. The technique proposed by Ho does not involve changing the predetermined measurement sequence, while repeating measurement of the measurement areas, of each of said measurement areas in such a manner that a measurement period of said high repetitive-frequency measurement area contains said time phase.

The cited art simply does not disclose or suggest changing a predetermined measurement sequence of each of said measurement areas in such a manner that a measurement period of said high repetitive-frequency measurement area contains said time phase (independent claims 1 and 21 of the present application).

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claims 1 and 21, and the claims depending therefrom, are patentable over the cited

art.

In addition, the cited art does not disclose or suggest selecting the high repetitive-frequency measurement area containing or being time-wise close to a desired time phase and at least one low repetitive-frequency measurement area measured time-wise close to said high repetitive-frequency measurement area from the measured measurement areas as an image reconstruction set (independent claim 22 of the present application).

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claim 22 and the claims depending therefrom are patentable over the cited art.

In view of the remarks hereinabove, Applicant submits that the application is now in condition for allowance. Accordingly, Applicant earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that are required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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